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AFRL/PRS
5 Pollux Drive
Edwards AFB CA 93524-7048

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REPORT

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Edwards AFB CA 93524-7048

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Approved for public release; distribution unlimited.

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19a. NAME OF RESPONSIBLE
PERSON

Leilani Richardson

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b. ABSTRACT

c. THIS PAGE

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A

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MEMORANDUM FOR PRS (Contractor/In-House Publication)

FROM: PROI (TI) (STINFO)

20 September 2000

SUBJECT: Authorization for Release of Technical Information, Control Number: **AFRL-PR-ED-AB-2000-180**
Tollison, Kerri (ERC), Drake, Greg; et al., "The Synthesis and Characterization of Methylene Bisoxamine
CH₂(-O-NH₂)₂ Salts"

HEDM Conference (Park City, UT, 24-26 Oct 2000)
(Deadline: 25 Sep 2000)

(Statement A)

1. This request has been reviewed by the Foreign Disclosure Office for: a.) appropriateness of distribution statement, b.) military/national critical technology, c.) export controls or distribution restrictions, d.) appropriateness for release to a foreign nation, and e.) technical sensitivity and/or economic sensitivity.

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Comments: _____

APPROVED/APPROVED AS AMENDED/DISAPPROVED

PHILIP A. KESSEL Date
Technical Advisor
Propulsion Science and Advanced Concepts Division

The Synthesis and Characterization of Methylene Bisoxamine $\text{CH}_2(-\text{O}-\text{NH}_2)_2$ Salts

Kerri Tollison*; Greg Drake; Tom Hawkins; Adam Brand; Milton McKay;
Ismail Ismail*; Claude Merrill
AFRL/PRSP & *ERC, Inc. 10 East Saturn Boulevard, Bldg 8451
Edwards Air Force Base, CA 93524-7190

Mark Petrie; Jeff Bottaro
SRI International, Inc.
333 Ravenswood Avenue
Menlo Park, CA 94025

The quest for new energetic materials for propellant research and development is an ongoing research effort at many facilities. Methylene bisoxamine, $\text{CH}_2(-\text{O}-\text{NH}_2)_2$, was first synthesized in the late 1960's at Edwards Air Force Base, as a colorless, stable liquid. The diperchlorate salt was heavily investigated as a solid propellant ingredient, but was dropped because of its slight impact sensitivity. Methylene bisoxamine is an oxyamine base capable of yielding both mono- and di-protonated species, depending on the stoichiometry used in its reactions with acidic materials. We have reinvestigated this highly energetic material, and have synthesized and fully characterized a large family of new salts, including species paired with the nitrate, perchlorate, dinitramide and nitroformate anions. All of the salts were characterized by vibrational (IR, Raman), multinuclear nmr (^1H , ^{13}C) spectra, differential scanning calorimetry (DSC) studies, and elemental analyses. Safety testing, including friction and impact tests, were carried out on all of the new salts, as well thermal stability studies at elevated temperatures, and all these results will be presented.

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